

E. Geology and Soils

Introduction

This section discusses the geologic and seismic setting, regulatory environment, and analyzes potential impacts associated with geologic and seismic hazards that may affect the proposed project. Because this project involves the demolition of an existing facility with no subsequent construction or long-term development, this analysis focuses on geologic and seismic impacts from the demolition itself. The setting and impact analysis is based on regional geologic and earthquake studies conducted by the California Geological Survey (CGS) and United States Geological Survey (USGS), and Berkeley Lab-specific geologic studies conducted by LBNL.

Setting

Geologic Setting

Geologists refer to the region of northern California between the Pacific Ocean and the Great Valley as the Coast Ranges Geomorphic Province.¹ This particular geologic region is characterized by northwest-trending mountain ranges with intervening valleys and the tectonic influence of the San Andreas Fault System. One such mountainous feature is the Diablo Range, which includes Mount Diablo, Mount Hamilton, and the mountains that form the eastern boundary of the Santa Clara Valley. The Diablo Range extends 130 miles from the Carquinez Strait to the town of Coalinga in the San Joaquin Valley.

The Hayward Fault forms a major structural boundary through the Oakland-Berkeley area, bounding rock types of similar age but of different composition and tectonic history. Bedrock of the Franciscan Assemblage is exposed in and west of the Hayward Fault Zone, while thick marine sedimentary formations (referred to as the Great Valley Complex), overlain by younger sedimentary and volcanic rocks, form the hills to the east.² Franciscan and Great Valley bedrock is exposed throughout this region.

The project site is situated on the western slopes of the Oakland-Berkeley Hills, which are raised uplands of the Diablo Range located between the Hayward Fault on the west and the northern Calaveras Fault Zone to the east. Building 51 is underlain by what geologic mapping identifies as sandstone, siltstone, and mudstone bedrock of the Great Valley Complex (Graymer, 2000). Geologic mapping is consistent with bedrock observed in road-cut exposures along Cyclotron Road which consist mostly of sandstone, with some interbedded mudstone (Fugro West, Inc., 2002a, 2002b, and 2002c).

¹ A geologic province is an area that possesses similar bedrock, structure, history, and age. California has 11 geologic provinces.

² Franciscan bedrock, also called the Franciscan Assemblage, refers to the extremely deformed marine sedimentary rocks in the Coast Ranges. These rocks bear the imprint of tectonic subduction, a process that forces the oceanic plate beneath a continental plate. As a result, the Franciscan Assemblage is highly disrupted; much of it has been transformed into a heterogeneous mixture of isolated blocks of hard rock surrounded by a pervasively sheared, shaly matrix.

Topography

The steep sloping hillsides of the Oakland-Berkeley Hills characterize the general topography throughout the majority of the LBNL site. Building 51 is constructed on a series of graded level areas adjacent to vegetated natural or manmade slopes, some of which reach a steepness of up to 100 percent. Given the degree of grading on the LBNL site, many of the slopes are supported by retaining structures or have otherwise been engineered for stability. Level, graded areas are connected by sloping roads and pedestrian walkways. The Building 51 site is located on one of the larger graded, near-level areas on the LBNL site with elevations varying between approximately 720 and 760 feet above mean sea level. The northeast side of the project site is bound by an upsloped area with average gradients approaching 60 percent while to the west of Building 51, past the parking lot across Lawrence Road, the hillside slopes downward, in places at slopes approaching 100 percent (USGS, 1980).

Mineral Resources

The California Department of Conservation, Geological Survey (CGS, formerly Division of Mines and Geology) has classified lands within the San Francisco-Monterey Bay Region into Aggregate and Mineral Resource Zones (MRZs) based on guidelines adopted by the California State Mining and Geology Board, as mandated by the Surface Mining and Reclamation Act (SMARA) of 1974 (Stinson et al, 1983). The CGS has mapped the project site as an MRZ-4, which is an area containing no known mineral occurrences where geologic information does not rule out either the presence or absence of significant mineral resources (Kohler, 1996).

Soils

The U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) (formerly known as the Soil Conservation Service) has characterized the majority of Building 51 site soils as Maymen loam, 30- to 75-percent slopes. Maymen loam is a shallow, moderately permeable soil that exhibits rapid to very rapid runoff and has a high to very high erosion hazard (USDA, 1981).

Seismicity

The San Francisco Bay Area contains both active and potentially active faults and is considered a region of high seismic activity.³ The USGS Working Group on California Earthquake Probabilities has evaluated the probability of one or more earthquakes of Richter magnitude 6.7 or higher occurring in the San Francisco Bay Area within the next 30 years. The result of the evaluation indicated a 62-percent likelihood that such an earthquake event will occur in the Bay Area between 2003 and 2032 (USGS, 2003).

³ An “active” fault is defined by the State of California as a fault that has had surface displacement within Holocene time (approximately the last 10,000 years). A “potentially active” fault is defined as a fault that has shown evidence of surface displacement during the Quaternary (last 1.6 million years), unless direct geologic evidence demonstrates inactivity for all of the Holocene or longer. This definition does not, of course, mean that faults lacking evidence of surface displacement are necessarily inactive. “Sufficiently active” is also used to describe a fault if there is some evidence that Holocene displacement occurred on one or more of its segments or branches (Hart, 1997).

Ground movement during an earthquake can vary depending on the overall magnitude, distance to the fault, focus of earthquake energy, and type of geologic material. The composition of underlying soils, even those relatively distant from faults, can intensify ground shaking. The Modified Mercalli (MM) intensity scale is commonly used to describe earthquake intensity and its effects on people or buildings due to ground shaking. The MM values for intensity range from I (earthquake not felt) to XII (damage nearly total); intensities ranging from IV to X could cause moderate to significant structural damage (CGS, 2002).⁴ At LBNL, maximum ground shaking intensity resulting from an earthquake generated on the Hayward Fault, discussed below, is anticipated to be very violent with a Mercalli Intensity of X (ABAG, 2003).

The project site is immediately adjacent to the Hayward Fault Zone and approximately 19 miles northeast of the active San Andreas Fault Zone (see **Figure IV.E-1**). Other principal faults capable of producing significant ground shaking at the project site are the San Gregorio-Hosgri, Calaveras, Concord–Green Valley, Marsh Creek–Greenville, and Rodgers Creek faults. The USGS Working Group on California Earthquake Probabilities estimates that there is a 27-percent chance that the Hayward–Rodgers Creek Fault System will experience an earthquake of M 6.7 or greater in the next 30 years (USGS, 2003). Two active traces of the Hayward Fault are close to but not within the project site; the nearest (“Main Trace”) is approximately 1,000 feet downslope, southwest of the project site, while the West Trace is located an additional 100 to 150 feet west (CGS, 1982) (see **Figure IV.E-2**). The USGS Working Group on California Earthquake Probabilities recently estimated that there is a 21-percent chance of the San Andreas Fault experiencing an earthquake of M 6.7 or greater in the next 30 years (USGS, 2003).

Regulatory Environment

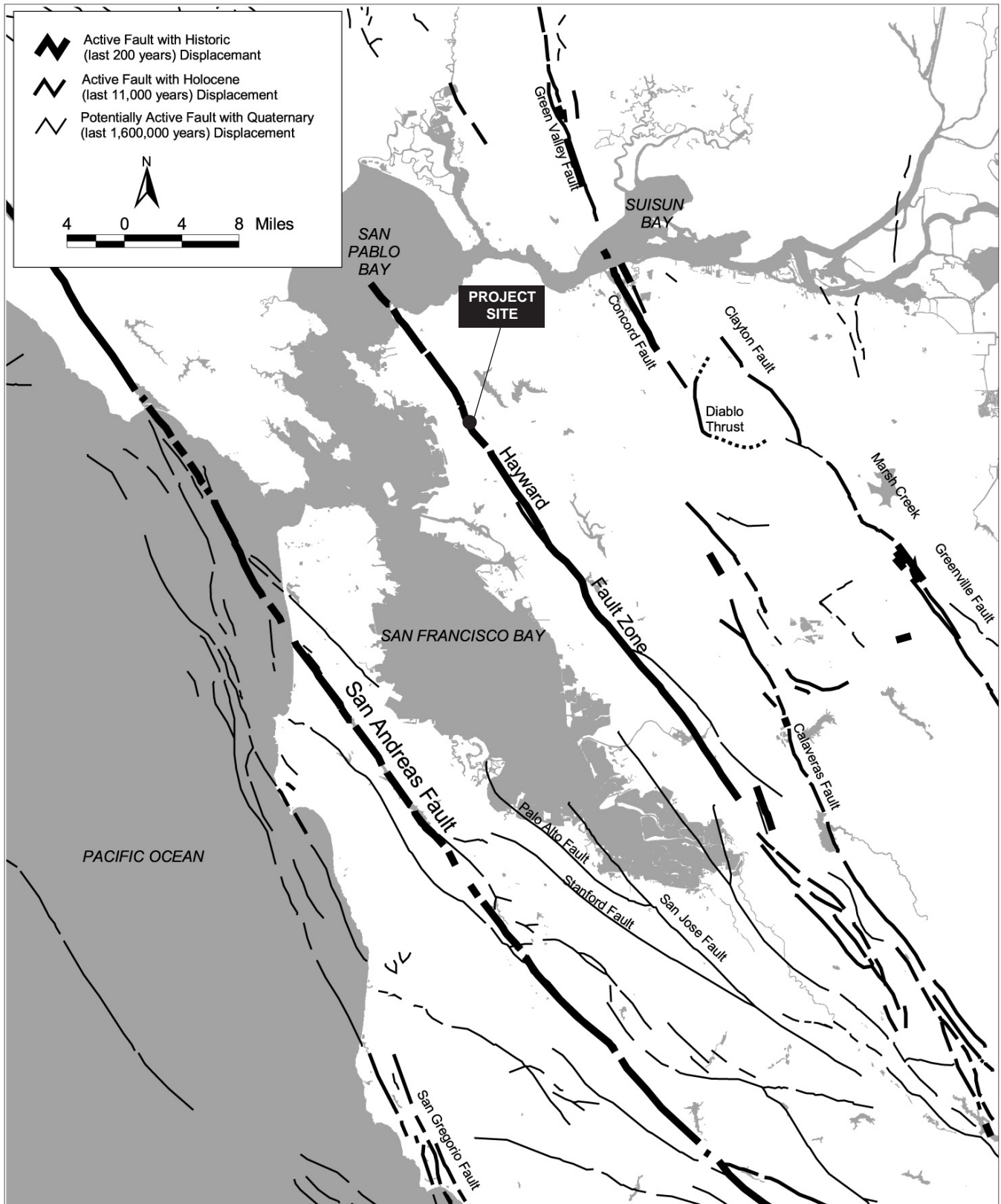
University of California Seismic Safety Policy

On January 17, 1995, the University adopted and updated its “Policy on Seismic Safety.” This establishes that University policy is “to acquire, build, maintain, and rehabilitate buildings and other facilities which provide an acceptable level of earthquake safety.” Building 51 has had limited use since 1993 and does not meet current building codes or seismic design standards that would make it safe during a significant earthquake event.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act was developed to protect the public from the effects of strong ground shaking, liquefaction, landslides, or other ground failure, and from other hazards caused by earthquakes. This act requires the State Geologist to delineate various seismic hazard zones and requires cities, counties, and other local permitting agencies to regulate certain development projects within these zones. Before a development permit is granted for a site within a Seismic Hazard Zone, a geotechnical investigation of the site must be conducted and appropriate

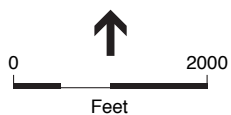
⁴ The damage level represents the estimated overall level of damage that will occur for various MM intensity levels. The damage, however, will not be uniform. Some buildings will experience substantially more damage than this overall level, and others will experience substantially less damage. Not all buildings perform identically in an earthquake. The age, material, type, method of construction, size, and shape of a building all affect its performance.



SOURCE: California Department of Conservation,
Geological Survey (After Jennings, 1994)

Demolition of Building 51 and the Bevatron / 204442 ■

Figure IV.E-1
Regional Fault Map



- Hayward fault trace, dashed where approximate and ? indicates additional uncertainty
- Alquist-Priolo special studies boundary

SOURCE: Environmental Science Associates

Demolition of Building 51 and the Bevatron / 204442 ■

Figure IVE-2
Hayward Fault Map

mitigation measures incorporated into the project design. Geotechnical investigations conducted within Seismic Hazard Zones must incorporate standards specified by California Geological Survey (CGS) Special Publication 117, Guidelines for Evaluating and Mitigating Seismic Hazards (CGS, 1997). The CGS has completed seismic hazard mapping in areas considered high priority in the San Francisco Bay Area. Areas of the Bay Area covered by an official map include the San Francisco Peninsula, the East Bay and the Oakland / Berkeley / Richmond area.

The geologic analysis for this EIR included a review of the official Seismic Hazard Map (SHM) for the Richmond and Briones Valley Quadrangles to determine whether the project site is included within a Seismic Hazard Zone area (CGS, 2003). The SHM indicates that the eastern and northern areas of the project site are considered hazard areas for earthquake-induced landsliding, while the level, more stable graded areas are not included within the hazard area. The Building 51 footprint itself, which is the only area in which actual demolition operations would take place (as opposed to, for example, areas used for parking and staging), appears to be in an area not zoned as a seismic hazard area for earthquake-induced landslides. Liquefaction hazard zones are not included on the SHM for this area because the area is underlain by bedrock and not loose, saturated granular soils that would be susceptible to liquefaction.

Although portions of the project site may be within a Seismic Hazard Zone, this zoning does not apply to the proposed project because the building site itself is not zoned, and the project involves demolition, with no new facility construction.

California Building Code

The California Building Code (CBC) is a portion of California Building Standards Code (CBSC, 1995), which is codified in the California Code of Regulations, Title 24, Part 2. The CBC is based on the 1997 edition of the Uniform Building Code and includes necessary California amendments that address seismic design criteria and requirements for construction activity. The CBC covers aspects of site work, demolition, and construction that would apply to the proposed project and provides code requirements for excavation and grading. For example, the CBC includes provisions for allowable slopes for permanent fills (not steeper than 50 percent), protection of excavation sidewalls in excavations greater than 12 feet, pedestrian protection, utilities protection, soil testing requirements, and the requirement for an excavation permit unless exempted by the appropriate LBNL building official.

See Section IV.G, Hydrology, for descriptions of other requirements affecting erosion control, such as LBNL's Stormwater Pollution Prevention Plan.

Impacts and Mitigation Measures

Significance Criteria

The potential exposure of LBNL projects to unstable geologic conditions, seismicity, and soil conditions would be considered significant if it would exceed the following standards of

significance, in accordance with Appendix G of the state CEQA Guidelines and the UC CEQA Handbook:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
 - Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault (Refer to Division of Mines and Geology Special Publication 42);
 - Strong seismic ground shaking;
 - Seismic-related ground failure, including liquefaction; or
 - Landslides.
- Result in substantial soil erosion or the loss of topsoil;
- Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse;
- Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property;
- Have soils incapable or adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water; or
- Exceed an applicable LRDP or Program EIR standard of significance.

Certain topics related to geology and seismicity are not discussed further in this impact analysis because they are not considered potential impacts of the project:

- Fault rupture. The project is not located on a trace of an active fault or within the Alquist-Priolo Earthquake Fault Hazard Zone, and therefore is not susceptible to ground surface rupture during an earthquake.
- Seismic ground shaking. If an earthquake were to occur during demolition activities, ground shaking may cause a temporary disruption to operations and possibly some minor damage. However, the demolition of Building 51 would not expose people or structures to substantial risk during an earthquake and therefore, the effects of ground shaking are not considered an impact of the project.
- Liquefaction. The project site has not been designated within a Seismic Hazard Zone for liquefaction (CGS, 2003). Due to project site conditions including shallow sandstone bedrock, the potential for liquefaction at the site is very low. Due to these site subsurface conditions, the project site is not anticipated to be affected by earthquake-induced settlement (Fugro West, Inc., 2002a).
- Geologic instability. The project involves demolition of a facility that is currently located on a stable geologic unit. Because the facility would be removed and the facility footprint converted to vacant area, the project would not cause a condition that would destabilize the underlying geology.

- Expansive soils. Once Building 51 is demolished, the area would be backfilled with imported, engineered fill and/or suitable fill stockpiled from other excavations at the LBNL site. Even if expansive soils were present, because the proposed project does not include the placement of any new structures, the presence of such soils would not create potential hazards to life or property.
- Septic / alternative waste disposal systems. The project does not include installation of septic systems or alternative waste disposal systems, and therefore this EIR does not evaluate the capability of existing or imported soils to support such systems.

Measures Included as Part of the Project

The following relevant impacts, resulting from exposure to unstable geologic or soil conditions, have been anticipated and analyzed pursuant to CEQA as part of the programmatic 1987 LRDP EIR, as amended, from which this analysis is tiered:

Impact III-B-1:	There could be significant impacts on people or property due to continued operation and the development of LBNL facilities in areas susceptible to surface rupture. There may be potential adverse impacts to people and property at the site caused by ground shaking, landsliding, lurching, and differential compaction during a seismic event.
Impact III-B-2:	Soil erosion, sedimentation and landsliding caused by construction work may adversely affect the stability of LBNL buildings placed on the site.
Cumulative Impacts:	No significant adverse cumulative impacts upon people or property are anticipated in or in the vicinity of LBNL as a result of geologic and/or soils hazards.

As a result of anticipated exposure to geologic and/or unstable soil conditions, the following mitigation measures, adopted as part of the 1987 LRDP EIR, as amended, are already required for the proposed project, and are therefore part of the project description:

Mitigation Measure III-B-1:	Geologic and soils studies will be undertaken during the design phase of each LBNL building project. Recommendations contained in those studies would be followed to ensure that the effects of landsliding, lurching, and liquefaction potential will not represent a significant adverse impact during a seismic event.
Mitigation Measure III-B-2a:	Excavation and earth moving will be designed for stability, and accomplished during the dry season when feasible. Drainage will be arranged to minimize silting, erosion, and landsliding. Upon completion, all land will be restored, covering exposed earth with planting.

- Mitigation Measure III-B-2c: Excavations will be shored as required by law to preclude minor short-term landslides during construction.
- Mitigation Measure III-B-2d: Revegetation of disturbed areas, including slope stabilization sites, using native shrubs, trees, and grasses will be included as part of all new projects.

Impacts

Impact IV.E-1: Demolition of the proposed building, including earthmoving activities such as backfilling and grading, could result in soil erosion or loss of topsoil. (Less than Significant)

Backfilling, grading, and other demolition activities associated with the project would require the removal of the shallow below-grade concrete foundation, and replacement of a portion of a retaining wall. In addition, there may be a need to excavate subsurface contaminated soil, although this quantity is anticipated to be small (approximately 200 cubic yards). This soil would be removed from the Laboratory, and hauled to an appropriate off-site location. Clean backfill would be used to restore to site to the current grade. The backfill would be compacted and hydro-seeded.

Soil erosion is a process whereby soil materials are worn away and transported to another area, either by wind or water. Rates of erosion can vary depending on the soil material and structure, placement, and human activity. Erosion is most likely to occur on sloped areas with exposed soil, especially where unnatural slopes are created by cut-and-fill activities.

The project proposes no excavation on sloped areas. If excavation is necessary, it would occur in localized areas and generate minimal quantities of soil, as noted above. A site- and project-specific erosion control plan would be included as part of the project design process and implemented as a condition for approval. This plan would include, as part of the proposed project, Mitigation Measures III-B-2a, III-B-2d, and III-C-2⁵ from the 1987 LRDP EIR, as amended, and development of a site-specific Stormwater Pollution Prevention Plan (SWPPP; see Section IV.G, Hydrology). The SWPPP would include, as feasible, the covering of excavated materials, installation of silt traps, fencing, and use of filter fabric as measures to control erosion and sedimentation as required by the California Construction General Permit, discussed in Section IV.G, Hydrology and Water Quality, of this EIR. Landscaping would then begin as soon as surface disturbances were finished for each relevant area. Due to these project characteristics, potential soil erosion hazards would be less than significant.

Mitigation: None required.

⁵ LRDP EIR, as amended, Mitigation Measure III-C-2 is included in Section IV.G, Hydrology and Water Quality, of this document.

Cumulative Impacts

Impact IV.E-2: The proposed project, in combination with other existing and anticipated development at LBNL and in nearby areas, could potentially result in significant adverse geologic and soils impacts. (Less than Significant)

The 1987 LRDP EIR, as amended, found that no significant adverse cumulative impacts upon people or property are anticipated in or in the vicinity of LBNL as a result of geologic and/or soils hazards. Compared with the existing population, greater numbers of people would be exposed to earthquake hazards as a result of growth anticipated in the 1987 LRDP EIR, as amended; growth anticipated in the LRDP EIR currently being prepared, including an unknown structure that may be built at the Building 51 site at some unknown future date; and other growth in the region. However, new structures would be built to current seismic design standards and would, in general, be safer than existing structures. The proposed demolition of Building 51 would therefore reduce overall potential cumulative earthquake hazard. The project does not contain a development component and the end result of the project would be an open area. As stated above, there would be no significant impacts from this project and it would not contribute to a cumulative impact.

Please refer to the cumulative impacts discussion under Section IV.A, Aesthetics, for a discussion of the reasons why the cumulative effects of a potential future project of unknown purpose and size at the Building 51 site are expected to be less than significant.

Mitigation: None required.

Summary of Impacts and Mitigation Measures

The proposed project would not exceed applicable standards of significance and would result in no significant impacts related to geology and soils. The project would incorporate Mitigation Measures III-B-1, III-B-2a, III-B-2c, and III-B-2d from the 1987 LRDP EIR, as amended.

Building 51 Project-Specific Mitigation Measures: None required.

References – Geology and Soils

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F. Hazards and Hazardous Materials

Introduction

This section discusses hazardous materials and waste that may be encountered or generated as a result of the proposed project. Potential fire hazards at the project site are also addressed. Seismic hazards are discussed in Section IV.E, Geology and Soils. Non-hazardous waste is discussed in Section IV.L, Utilities, Service Systems, and Energy. Due to the complexity of the issues involved, this section has been organized slightly differently from other sections in this EIR.

Setting

Hazardous Materials and Waste

Hazardous materials are substances with certain physical properties that could pose a substantial present or future hazard to human health or the environment when improperly handled, disposed of, or otherwise managed. Hazardous materials are grouped into the following four categories, based on their properties: toxic (causes human health effects), ignitable (has the ability to burn), corrosive (causes severe burns or damage to materials), and reactive (causes explosions or generates toxic gases).¹ Hazardous materials are commonly used in commercial, agricultural, and industrial applications, as well as in residential areas to a limited extent. A hazardous waste is any hazardous material that is discarded, abandoned, disposed, or is to be recycled. The same criteria that render a material hazardous also make a waste hazardous.²

Regulatory Environment

LBNL is subject to environmental, health, and safety regulations applicable to the transportation, use, management, and disposal of hazardous materials and waste. This section provides an overview of the regulatory setting for health and safety at the project site.

The primary federal agencies with responsibility for hazardous materials management include the U.S. Environmental Protection Agency (EPA), U.S. Department of Labor Occupational Safety and Health Administration (OSHA), U.S. Department of Transportation (DOT), and U.S. Department of Energy (DOE). Applicable federal laws, regulations, and responsible agencies are shown in **Table IV.F-1** and are discussed in detail in this section. In many cases, California state law mirrors or is more restrictive than federal law, and enforcement of these laws has been delegated to the state or a local agency. In January 1996, the California Environmental Protection Agency adopted regulations implementing a Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program). The Unified Program has six elements: hazardous waste generators and hazardous waste on-site treatment, underground storage tanks, aboveground storage tanks, hazardous materials release response plans and inventories, risk plans and inventories. The Unified Program is implemented at the local level, and the local agency

¹ Title 22 of the California Code of Regulations, Division 4.5, Chapter 11, Article 3.

² California Health and Safety Code, Section 25151.

TABLE IV.F-1
HAZARDOUS MATERIALS MANAGEMENT:
RELEVANT FEDERAL LAWS, REGULATIONS, AND AGENCIES

Classification	Law or Responsible Federal Agency	Description
Hazardous Materials Management	Emergency Planning and Community Right-to-Know Act of 1986 (also known as Title III of the Superfund Amendments and Reauthorization Act)	Imposes requirements to ensure that hazardous materials are properly handled, used, stored, and disposed of and to prevent or mitigate injury to human health or the environment in the event that such materials are accidentally released.
Hazardous Waste Storage, Handling, and Disposal	Resource Conservation and Recovery Act (RCRA)	Authorizes the EPA to regulate the generation, transportation, treatment, storage, and disposal of hazardous waste from "cradle to grave."
	Hazardous and Solid Waste Amendments Act	Amended RCRA in 1984, affirming and extending the "cradle to grave" system of regulating hazardous wastes. The amendments specifically prohibit the use of certain techniques for the disposal of some hazardous wastes.
Hazardous Materials Transportation	U.S. Department of Transportation (DOT)	DOT has regulatory responsibility for the safe transportation of hazardous materials. DOT regulations govern all means of transportation except packages shipped by mail (49 Code of Federal Regulations).
	U.S. Postal Service	U.S. Postal Service regulations govern the transportation of hazardous materials shipped by mail.
Occupational Safety	U.S. Occupational Safety and Health Administration (OSHA)	OSHA sets standards for safe workplaces and work practices, including the reporting of accidents and occupational injuries (29 Code of Federal Regulations).
Radioactive Materials	Atomic Energy Act	Administered by DOE at LBNL; regulates the control and disposal of radioactive material.
	U.S. Environmental Protection Agency (EPA)	The EPA regulates airborne radioactive air emissions.
	Clean Air Act	The law administered by EPA that regulates toxic or hazardous air pollutants, including radionuclides.
Building Components, Materials, and Equipment (USTs, ASTs, PCBs, and asbestos)	Toxic Substances Control Act (TSCA)	Regulates the use and management of polychlorinated biphenyls (PCBs) in electrical equipment and sets forth detailed safeguards to be followed during the disposal of such items (40 Code of Federal Regulations).
	Resource Conservation and Recovery Act (RCRA)	Establishes requirements for the design, installation, and operation of underground storage tanks (USTs).
	Clean Water Act	Requires owners of petroleum aboveground storage tanks (AST) and USTs to develop a Spill Prevention, Control, and Countermeasures Plan.
	OSHA	OSHA establishes requirements to protect workers during activities that could involve exposure to lead or asbestos.
	EPA	The EPA establishes requirements to protect the environment during asbestos removal activities. The EPA banned the use of asbestos in the 1970s.
	Clean Air Act	The law administered by EPA that regulates toxic or hazardous air pollutants.

responsible for implementation is called the Certified Unified Program Agency (CUPA). At LBNL, the City of Berkeley and the City of Oakland are the designated CUPAs. In order to streamline their oversight of CUPA regulations at LBNL, these cities have entered into a Memorandum of Understanding that established the City of Berkeley as the lead agency for all CUPA activities (other than emergency release reporting).

Hazardous Materials Management

Federal and state laws require detailed planning to ensure that hazardous materials are properly handled, used, stored, and disposed of, and in the event that such materials are accidentally released, to prevent or to mitigate injury to human health or the environment. These laws require hazardous materials users to prepare written plans, such as Hazard Communication Plans and Hazardous Materials Management Plans. Laws and regulations require hazardous materials users to store these materials appropriately and to train employees to manage them safely. A number of agencies participate in enforcing hazardous materials management requirements. The Federal Emergency Planning and Community Right-to-Know Act (EPCRA), enacted as Title III of the Superfund Amendments and Reauthorization Act (SARA), requires facilities handling in excess of designated threshold quantities of hazardous materials to provide hazardous materials, hazardous waste, and emission information to public agencies and to prepare emergency response plans for accidents or other unauthorized releases of designated threshold quantities of hazardous materials. More stringent emergency response handling is required for facilities handling designated “extremely hazardous substances.” Hazardous materials present in exempt quantities or under the direct supervision of a technically qualified individual are exempt for EPCRA reporting, inventory, and emergency planning requirements. In California, the requirements of SARA Title III are incorporated into the state’s Hazardous Materials Release Response Plans and Inventory Law.³

This law is administered by the City of Berkeley through its CUPA program, and requires any business that handles hazardous materials above certain thresholds to prepare a Hazardous Materials Business Plan, which must include the following:

- Details of the facility and business conducted at the site;
- An inventory of hazardous materials that are handled or stored on-site;
- An emergency response plan; and
- A safety and emergency response training program for new employees with annual refresher courses.

Although sovereign immunity for federal facilities has not been waived in the federal law, LBNL voluntarily complies with these state requirements as implemented by the City of Berkeley.

The Toxic Substances Control Act (TSCA) also establishes reporting requirements for polychlorinated biphenyls (PCBs). Because the volume of PCBs at LBNL is below the TSCA threshold, however, LBNL is not required to prepare an annual report for the EPA.

Hazardous Waste Handling

The federal Resource Conservation and Recovery Act of 1976 (RCRA) created a major federal hazardous waste “cradle-to-grave” regulatory program administered by the EPA. Under RCRA, the EPA regulates the generation, treatment, and disposal of hazardous waste and the

³ California Health and Safety Code 25500.

investigation and remediation of hazardous waste sites. Individual states may apply to the EPA to authorize them to implement their own hazardous waste programs in lieu of RCRA, as long as the state program is at least as stringent as federal RCRA requirements. The EPA has authorized California to implement its own hazardous waste program, with certain exceptions.

In California, the Department of Toxic Substances Control (DTSC) regulates the generation, transportation, treatment, storage, and disposal of hazardous waste, and the investigation and remediation of hazardous waste sites. The California DTSC program incorporates the provisions of both federal and state hazardous waste laws.

LBNL manages the storage, treatment, and disposal of hazardous wastes at its Hazardous Waste Handling Facility (HWHF). LBNL's waste management program sends hazardous, mixed, medical, and radioactive waste generated at the Laboratory off-site for disposal. Specific low-level aqueous wastes at Berkeley Lab (containing only radioisotopes with short half-lives) are stored until the radioactivity has decayed to undetectable levels; the wastes are then discharged in conformance with wastewater discharge permits issued by East Bay Municipal Utility District (EBMUD).

Occupational Safety

Federal and state laws provide occupational safety standards to minimize worker health and safety risks from both physical and chemical hazards in the workplace. The federal Occupational Safety and Health Administration (OSHA) is responsible for assuring worker safety in the workplace. At DOE facilities such as LBNL, the OSHA worker safety program is administered by DOE pursuant to the authority provided it by the Atomic Energy Act over health and safety at its facilities. DOE enforces OSHA requirements in accordance with a Memorandum of Agreement with OSHA.

OSHA regulations (29 Code of Federal Regulations [CFR] 1910 and 1926) contain requirements concerning the use of hazardous materials in the workplace and during construction that mandate employee safety training, safety equipment, accident and illness prevention programs, hazardous substance exposure warnings, emergency action and fire prevention plan preparation, and a hazard communication program. The hazard communication program regulations contain training and information requirements, including procedures for identifying and labeling hazardous substances and communicating hazard information relating to hazardous substances and their handling. The hazard communication program also requires that Material Safety Data Sheets be available to employees, and that employee information and training programs be documented. These regulations also require preparation of emergency action plans (escape and evacuation procedures, rescue and medical duties, alarm systems, and training in emergency evacuation).

The federal OSHA regulations include special provisions for hazard communication to employees in research laboratories, including training in chemical work practices. Specific, more detailed training and monitoring is required for the use of carcinogens, ethylene oxide, lead, asbestos, and certain other chemicals listed in 29 CFR. Emergency equipment and supplies, such as fire

extinguishers, safety showers, and eye washes, must also be provided and maintained in accessible places.

The OSHA regulations also include extensive, detailed requirements for worker protection applicable to any activity that could disturb asbestos-containing materials, including maintenance, renovation, and demolition. These regulations are also designed to ensure that people working near the maintenance, renovation, or demolition activity are not exposed to asbestos.

Radioactive Materials

Pursuant to the federal Atomic Energy Act, DOE regulates the storage and use of sources of ionizing radiation (radioactive material and radiation-producing equipment) at DOE contractor-managed sites like LBNL. Radiation protection regulations require control of sources of ionizing radiation and radioactive material and protection against radiation exposure. DOE regulations concerning occupational radiation exposure are prescribed in 10 CFR 835, Occupational Radiation Protection. These regulations specify appropriate worker safety precautions and worker health monitoring programs. Radiation protection requirements for the public and the environment are prescribed in DOE Order 5400.5, "Radiation Protection of the Public and the Environment." The use of radioactive materials at LBNL is also subject to EPA radioactive air emission regulations in 40 CFR Part 61, Subpart H, National Emission Standards for Hazardous Airborne Pollutants (NESHAP) other than Radon from DOE Facilities. Under this regulation, all potential emission sources are controlled and assessed, and the assessments are reported annually to DOE and the EPA. In addition, all use of radioactive materials at LBNL is conducted in accordance with an internal authorization process that has been approved by DOE. Emissions of radioactive material to the environment are monitored as described by LBNL's Environmental Monitoring Plan, which ensures that all Laboratory activities operate within regulatory requirements. Potential public exposures from radiological emissions from LBNL are less than 1 percent of the EPA regulatory limit of 10 millirem⁴ (mrem) per year for airborne emissions.⁵

DOE also regulates radioactive waste and the radioactive portion of mixed waste⁶ pursuant to the Atomic Energy Act and DOE Order 435.1, Radioactive Waste Management. Radioactive and mixed wastes are routinely generated from LBNL research activities involving radioisotopes. Routinely generated radioactive and mixed wastes are staged in radioactive waste accumulation areas at individual generator sites, and subsequently transported to the LBNL Hazardous Waste Handling Facility for storage and eventual off-site disposal. Radioactive waste is either managed on-site through a decay-in-place program or is shipped off-site to a licensed commercial or DOE treatment/disposal facility.

⁴ A rem is a measure of a person's exposure to radiation. A millirem, also written as mrem, is 1/1,000th of a rem.

⁵ For comparison, 10 mrem is roughly equivalent to the additional radiation a passenger would receive during two to four round-trip cross-country airline trips (radiation at altitude is higher than on the ground because the thinner atmosphere provides less shielding from the sun's rays). A medical chest x-ray exposes the patient to between about 20 and 50 mrem. SOURCES: San Luis Obispo County website, "About Radiation": <http://www.slocountyoes.com/emergencyplanning/radiation.html>; Washington University (St. Louis, Mo.), Environmental Health and Safety, Monthly Health and Safety Update, August 2002: <http://www.ehs.wustl.edu/Topic/topic802.htm>.

⁶ Mixed waste contains both radioactive materials and other hazardous materials.

Hazardous Materials Transportation

DOT regulates the transportation of hazardous materials between states. DOT regulations govern all means of transportation, except that U.S. Postal Service regulations govern packages sent by mail. DOT regulations are contained in the 49 CFR. U.S. Postal Service regulations are found in 39 CFR. The State of California has adopted DOT regulations for the intrastate movement of hazardous materials. In addition, the State of California regulates the transportation of hazardous waste originating in the state and passing through the state. State regulations are contained in Title 26 of the California Code of Regulations (26 CCR). Both regulatory programs apply in California.

The two state agencies that have primary responsibility for enforcing federal and state regulations and responding to hazardous materials transportation emergencies are the California Highway Patrol (CHP) and the California Department of Transportation (Caltrans).

The CHP enforces hazardous material and hazardous waste labeling and packing regulations to prevent leakage and spills of material in transit and to provide detailed information to cleanup crews in the event of an accident. Vehicle and equipment inspection, shipment preparation, container identification, and shipping documentation are all part of the responsibility of the CHP, which conducts regular inspections of licensed transporters to assure regulatory compliance. Caltrans has emergency chemical spill identification teams at as many as 72 locations throughout the state that can respond quickly in the event of a spill. In addition, the State of California regulates the transportation of hazardous waste originating or passing through the state.

Common carriers are licensed by the CHP pursuant to California Vehicle Code Section 32000. This section requires the licensing of every common carrier who transports, for a fee, in excess of 500 pounds of hazardous materials at one time, and every carrier, if not for hire, who carries more than 1,000 pounds of hazardous material of the type requiring placards.

Every hazardous materials package type used by a hazardous materials shipper must undergo tests that imitate some of the possible rigors of travel. While not every package must be put through every test, representative packages for any package design must be able to 1) be dropped, fully loaded, onto a concrete floor with no significant leakage; 2) survive a compression test in a stacked configuration with no significant damage or distortion; 3) demonstrate leakproofness when subjected to internal air and/or liquid pressure; and 4) not have package closure mechanisms adversely affected by vibration.

Off-site shipments of radioactive and other hazardous materials are also discussed in Section IV.K, Transportation/Traffic.

Emergency Response

The federal Emergency Planning and Community Right-to-Know Act of 1986 requires detailed planning to ensure that hazardous materials are properly handled, used, stored, and disposed of to prevent or minimize adverse effects on human health or the environment in the event such materials are accidentally released. California has developed an emergency response plan to

coordinate emergency services provided by federal, state, and local governmental agencies and private firms. Responding to hazardous materials incidents is one part of this plan. The plan is administered by the State Office of Emergency Services, which coordinates the responses of other agencies, including the California Environmental Protection Agency, the CHP, the Department of Fish and Game, the San Francisco Bay Regional Water Quality Control Board, and the Alameda County Fire Department. LBNL's on-site fire station, staffed by the Alameda County Fire Department, provides first response capabilities, if needed, for on-site hazardous materials emergencies.

LBNL Hazardous Materials Plans and Policies

The 1987 LBNL Long Range Development Plan is a long-term planning document that provides a comprehensive framework for implementing the Laboratory's mission. The following are among the specific purposes of the LRDP relevant to hazards and hazardous materials:

- Protect the environment, plan for site amenities and constraints, and buffer activities from adjacent populations; and
- Ensure a safe, healthful, and attractive workplace, improve access and communication with the University community, and provide transportation and parking systems for employees and the visiting public.

As more fully described in the 1987 LRDP EIR, as amended, potential impacts on hazards and hazardous materials could result from continued University operation of LBNL, including continued facility development as contemplated in the 1987 LRDP.

In addition to the regulatory framework for hazardous materials and waste described previously, LBNL has implemented policies, programs, and guidance documents that in some cases contain protective measures beyond what is required by laws and regulations. LBNL also continues to implement mitigation measures established by the 1987 LRDP, as amended, that further strengthen environment, health, and safety programs at the site.

The LBNL Environment, Health, and Safety (EH&S) Division has primary responsibility for developing compliance strategies and programs for meeting the requirements of federal, state, and local environmental laws and regulations, and for developing internal LBNL policies and procedures. In conformance with applicable laws and regulations, the EH&S Division establishes procedures for storage, handling, use, and disposal of hazardous and radioactive materials. These are described in PUB-3000, the LBNL Health and Safety Manual; PUB-3140, the Integrated Environment, Health and Safety Management Plan; and in other supporting EH&S documents. LBNL's Hazardous Materials Business Plan lists the hazardous materials that are stored in each LBNL building in quantities that meet or exceed the state's minimum reporting requirements. The plan also summarizes emergency plans, procedures, and training (LBNL, 2005).

To effectively control potential hazards when demolition activities are planned, LBNL conducts a survey and/or review of existing data to determine if hazardous substances or radioactivity may be encountered in the building or below it. Hazardous and radioactive substances are handled and,

if necessary, removed in accordance with applicable regulations and LBNL policies (e.g., as specified in PUB-3000) prior to the start of demolition activities in order to avoid hazardous exposures to workers or the public or releases to the environment.

The LBNL Facilities Division has developed project specifications that are applicable to all contractors performing various activities, including demolition. These specifications include requirements that contractors meet applicable environment, health, and safety regulations and LBNL requirements, and that contractor employees receive an initial EH&S orientation prior to performing work. If required to work in certain areas, such employees must attend a hazard-specific safety training session, for example, given by the LBNL Radiation Protection Group for work in radiation controlled areas. LBNL project managers and/or assigned delegates periodically monitor contractor compliance with EH&S requirements.

Hazardous Materials Potentially at Building 51

A number of hazardous materials were used or generated at Building 51. Among these are asbestos-containing materials used in the construction of Building 51, polychlorinated biphenyls (PCBs) and mercury used in electrical or research equipment, lead used as shielding during operation of the Bevatron, lead-based paint used in the building, radioactivity in Bevatron components and shielding, and beryllium in Bevatron beamline targets, as well as other chemicals or radioactive materials.

Major examples of hazardous materials that may be encountered in the course of the proposed demolition project are described below, along with the LBNL approach to dealing with these materials. Estimates of the quantities and destinations of the hazardous and non-hazardous materials that would be sent off-site are presented in **Table IV.L-1** in Section IV.L, Utilities, Service Systems, and Energy.

Radioactive Materials

While it is known from previous surveys that there is no radioactivity above naturally occurring levels in the outer structure of Building 51,⁷ portions of the Bevatron apparatus, its concrete block shielding, and other items have low levels of radioactivity above naturally occurring levels. All of the radioactive waste that would be generated by the project would be classified as low-level radioactive waste, or mixed waste containing low-level radioactive waste, as discussed below. Three main types of low-level radioactive waste would be sent off-site as a result of the project:

- Volume contamination. Some concrete shielding blocks and concrete foundation, metal Bevatron components, and miscellaneous items (e.g., some tools) have volume contamination from induced radioactivity. For many years, the Bevatron accelerator beams produced thermal neutrons as a byproduct of normal operations for research experiments. These neutrons had the ability to penetrate into solid items to varying depths depending on the properties of the material. This process has resulted in low levels of induced radioactivity contained within the matrix of the present-day concrete and steel. This

⁷ *Protocol for Survey and Release of Bevatron Materials* (June 30, 2005; Appendix C of this EIR).

induced radioactivity is securely contained within the matrix of the concrete and metal and cannot be removed or transferred by simple contact with the surface of the concrete.

There is little likelihood of induced activity in the majority of the concrete shielding blocks, as only the blocks closest to the beams produced by the Bevatron were exposed to thermal neutrons. Surveys to date of similar blocks found within the Building 51 complex confirm that most blocks have no detectable induced activity. Those that have induced activity have low levels of such activity. This low-level induced activity is of a magnitude similar to the natural radioactivity within the concrete, which typically ranges from 15 to 30 picocuries⁸ per gram (pCi/g) total activity. This background radioactivity originates from the elements within crushed stone aggregate that is present in all concrete, and comes primarily from the decay of naturally-occurring radioisotopes of potassium, uranium and its decay series, and thorium and its decay series. The induced radioisotopes that are contained within the concrete shielding include cobalt-60, europium-152/154, barium-133, and cesium-137.

In the Bevatron accelerator apparatus itself, the most prevalent material is steel, with a substantial amount of copper and minor amounts of aluminum and other metals. Preliminary surveys indicate that while a greater proportion of the metals may be activated, the range of activity will be similar to that found in the concrete blocks. The primary isotopes in metals are cobalt-60, titanium-44, and iron-55.

- Surface contamination. A far smaller number of items may have surface contamination. Surface radioactivity resulted from the disintegration of radioactive targets that were used in some accelerator experiments. As a result of particle beam collisions with these targets, some interior surfaces of the beam tube were contaminated with low levels of various radioactive materials. It is anticipated that very limited amounts of surface radioactivity, affecting a small volume of materials, would be encountered.
- Uranium. Two types of shielding blocks contain uranium in excess of naturally occurring amounts. As a result of the materials or processes used in their manufacture to increase their density, a small number of blocks may have concentrations of uranium that cause the radioactivity of these blocks to be above background levels.⁹ A small number of other blocks are composed of solid depleted uranium metal encased in steel.¹⁰

Materials that LBNL has reason to suspect might contain radioactivity would be characterized¹¹ by taking external radiation measurements using appropriate survey instrumentation and/or swipe

⁸ A picocurie is a combination of the Curie, a basic unit of measurement of the rate of radioactive decay, and the prefix pico, which modifies that unit to be 1/1,000,000,000,000 of its basic value. A picocurie is equal to 2.2 disintegrations per minute (dpm).

⁹ A typical background concentration of U-238 in concrete is 0.5 - 1 pCi/g; the blocks with the elevated levels are typically 35 to 200 pCi/g.

¹⁰ Depleted uranium blocks have activity levels of approximately 500,000 pCi/g.

¹¹ Characterization is the detailed documentation of the waste constituents such that the appropriate treatment, storage, and disposal decisions can be made. Characterization can include, for example, process knowledge, laboratory analysis, or written documentation (log books, formulas, etc.). LBNL's laboratory is accredited by the State of California Environmental Laboratory Accreditation Program for radionuclide analysis.

samples according to DOE-approved protocols. Following characterization, the different categories of radioactive waste discussed above would be handled as follows:

- Volume contamination. DOE requires that waste items that have detectable DOE-added induced radioactivity (i.e., radioactivity above the background level that is added while the materials are at a DOE site or under DOE control) are to be managed as radioactive waste. For this project, as set out in the LBNL EH&S Protocol for Survey and Release of Bevatron Materials (June 30, 2005; Appendix C), the DOE Berkeley Site Office has approved methods that can detect radioactivity down to 2 pCi/g of radioactivity above background.¹² The Laboratory anticipates that less than one-third of the shielding blocks, as well as some other items, will have volume contamination. However, it is expected that much of the Bevatron apparatus itself will have detectable DOE-added radioactivity above naturally occurring levels.

Two main options exist for the disposition of items with detectable volume contamination. The first is transfer the items to other DOE facilities for reuse. Other DOE facilities are permitted to receive and reuse such materials, e.g., for their own accelerator operations. At this time, however, no DOE users for Bevatron components or shielding blocks have been found. The second option, and the one expected to apply to all such items generated during the proposed project, is disposal as low-level radioactive waste at a DOE-authorized facility for, such as Envirocare in Clive, Utah, a licensed, privately operated facility; or the Nevada Test Site, a DOE facility approximately 65 miles from Las Vegas.

- Surface contamination. Different regulatory thresholds apply for surface contaminated items, varying with the nature and type of contamination involved. These are presented in DOE Order 5400.5. All material with surface contamination above these thresholds would be disposed as low-level radioactive waste at a DOE-authorized facility, as discussed above.
- Uranium. All blocks containing uranium above background levels, and all depleted uranium blocks, would also be sent to a DOE-authorized disposal facility.

It is anticipated that all Bevatron accelerator components would be disposed of at Envirocare. Regarding metals, the project would comply with the July 2000 DOE Metals Release Suspension¹³ and with an April 2005 agreement between LBNL and the DOE Berkeley Site Office regarding LBNL's implementation of this policy (*Agreement between LBNL and DOE Berkeley Site Office, LBNL Implementation of DOE Metal Release Suspension*, Appendix C). Applicable provisions include the following:

¹² This level is more conservative than the clearance screening level of 30 pCi/gram that is recommended in the national standard ANSI N13.12 "Surface and Volume Radioactivity Standards for Clearance." It is also comparable to the concentration of the natural radioactivity found in concrete.

¹³ The DOE Metals Release Suspension suspended the unrestricted release of metals from Radiological Areas for recycling into commerce. There currently are no such Radiological Areas at Building 51. However, when the Bevatron was in operation, some of these areas did exist, due to the dose produced by Bevatron operations. Metals from former as well as current Radiological Areas are included in LBNL's implementation of this DOE policy.

- Metals from controlled areas at accelerators where the metals may have become activated by exposure to beams would not be released for unrestricted recycling into commerce. Some areas within Building 51 contain such controlled areas. Metals covered by the suspension policy would be surveyed in accordance with the June 2005 *Protocol for Survey and Release of Bevatron Materials* referenced earlier. If the metal is contaminated, it would be held in a controlled area until disposed as radioactive waste. If there is no detectable activity, it would be disposed of at an appropriate landfill with a written agreement by the landfill that the metals would be prohibited from being recycled into commerce.
- The following are not within the scope of the DOE Metals Release Suspension: the release of property or equipment for reuse for their intended purpose, metals from locations other than former Radiological Areas, the recycle of non-metal materials, and rebar and other embedded metal materials in concrete that are not surface contaminated or volumetrically contaminated due to induced activity. Such metals, including Building 51 structural steel, are subject to unrestricted, "free" release. For example, they could be reused, recycled, or sent to a landfill taking non-hazardous solid waste.

Items contaminated with both radioactivity and non-radioactive hazardous waste (e.g., any lead shielding with induced radioactivity) would be managed as mixed waste and would be disposed at Envirocare or other authorized disposal facilities.

Asbestos

Asbestos is a naturally occurring fibrous material that was used as a fireproofing and insulating agent in building construction (e.g., in insulation, shingles, ceiling tiles, and floor tiles) before such uses were banned by EPA in the 1970s. The potential risk to human health is from inhalation of airborne asbestos when asbestos-containing materials (ACM) are disturbed during such activities as demolition and renovation. ACM can be divided into two general categories: friable and non-friable. Friable ACM products are those that can be readily crumbled or powdered by hand pressure, and are of more concern than non-friable ACM because of their greater potential for generating airborne fibers. Intact and sealed friable asbestos materials are considered non-friable and do not pose a health risk if they are undisturbed and undamaged. Non-friable ACMs generally possess a strong binder such as cement or vinyl, which stabilizes the asbestos, reducing the likelihood of generating airborne asbestos dust. However, actions such as sanding, grinding, cutting or drilling of non-friable asbestos can result in the release of asbestos fibers.

The exterior siding of Building 51 is composed of transite, a material typically containing approximately 20 percent non-friable chrysotile asbestos fibers. Building 51 is also known to contain non-friable ACMs in vinyl asbestos floor tiles, roofing felt, and insulation. In addition, due to the age of the building, friable asbestos might be encountered.

Federal regulations governing asbestos include EPA's National Emission Standard for Hazardous Air Pollutants, the Asbestos Hazard Emergency Response Act, and OSHA's Asbestos Standard for the Construction Industry. On the state level, several laws mirror or exceed the federal requirements. Similar to federal laws, state laws and regulations also pertain to building materials

containing asbestos. These regulations prohibit emissions of asbestos from asbestos-related manufacturing, demolition, or construction activities; require medical examinations and monitoring of employees engaged in activities that could disturb asbestos; specify precautions and safe work practices that must be followed to minimize the potential for release of asbestos fibers; and require notice to regulatory agencies prior to beginning renovation or demolition that could disturb asbestos.

Section 19827.5 of the California Health and Safety Code, adopted January 1, 1991, requires that local agencies not issue demolition or alteration permits until an applicant has demonstrated compliance with notification requirements under applicable federal regulations regarding hazardous air pollutants, including asbestos. The California legislature has vested the Bay Area Air Quality Management District (BAAQMD) with authority to regulate airborne pollutants, including asbestos, through both inspection and enforcement responsibilities. The BAAQMD is to be notified ten days in advance of any proposed demolition or abatement work.

LBNL has a comprehensive Asbestos Management Program to manage the presence of asbestos materials at the Laboratory. Prior to undertaking demolition activities, a screening survey is required to identify ACMs, along with sampling to assess and quantify ACMs for removal. Removal of ACMs would be conducted by a licensed and certified asbestos abatement contractor who would remove ACMs in accordance with the LBNL Asbestos Management Program. The ACM abatement would be conducted under the oversight of Lab personnel and subject to inspection by the BAAQMD. All of the abatement work must meet the requirements of OSHA, EPA, and BAAQMD regulations. Section IV.B, Air Quality, describes the asbestos-related permits that would be required for the proposed project.

PCBs

Polychlorinated biphenyls (PCBs) are synthetic organic oils that formerly were used in many types of electrical equipment, including transformers and capacitors, primarily as electrical insulators. In 1979, the EPA banned the use of PCBs in most new electrical equipment and began a program to phase out certain existing PCB-containing equipment.

All transformers and capacitors known to contain PCBs have already been removed from Building 51 and properly disposed. The only remaining equipment that may contain PCBs are light ballasts. PCBs were found in soil and groundwater samples taken from under the foundation of the building. Soil cleanup measures were completed such that the PCB contaminants have been reduced to levels considered "protective of human health and the environment" under EPA risk assessment guidelines. Some groundwater contamination remains and continues to be remediated by LBNL under a program that is separate from this project.

The use and management of PCBs in electrical equipment is regulated pursuant to the Toxic Substances Control Act (TSCA) and its implementing regulations. These regulations generally require labeling and periodic inspection of certain types of PCB equipment and set forth detailed procedures to be followed for disposal of these items and for responding to PCB spills. The TSCA regulations are administered by the EPA. Materials or equipment containing PCBs not

regulated as hazardous under TSCA regulations may still be regulated as hazardous waste under Title 22 of the California Code of Regulations, depending on the concentration. PUB-3000 contains LBNL EH&S Division policies and procedures for the handling of PCBs.

Lead

Lead-based paint was common until 1978, when the Consumer Product Safety Commission banned the use of paint containing lead at levels of over 600 parts per million for residential and toy purposes.¹⁴ Some painted surfaces at Building 51, such as structural steel, drywall, ceilings, and exterior surfaces, could contain lead-based paint. In addition, lead dust contaminates some of the interior surfaces of Building 51. Sources of this dust include the operation of internal combustion engines using leaded gasoline and the handling of solid forms (blocks, sheets, bricks) of lead, which were used as radiation shielding during operation of the Bevatron. LBNL has a Lead Compliance Program that covers all facets of lead handling from the use of lead in experiments to disposal of lead-containing materials. In accordance with this program, lead-contaminated surfaces would be vacuumed using HEPA-filter-equipped¹⁵ vacuums to remove surface deposits. Any such lead control measures would also be effective in controlling surface contamination by any other hazardous materials that may be present.

Mercury

Mercury was present in klystron tubes that were used for high energy physics research associated with the accelerator at Building 51, and some electrical switches, diffusion pumps, and gauges still at the facility may contain mercury. A mercury spill on the concrete floor of the facility was detected and cleaned up in the late 1990s. Similarly, mercury was found in plumbing and floors in another section of the building and cleaned up around this same time. It is possible that other mercury contamination may be discovered during the proposed project, e.g., in a location near the Motor Generator Room where components containing mercury were stored and handled. Mercury would be handled in accordance with PUB-3000.

Beryllium

Small amounts of solid beryllium have been found inside portions of the shielded area within Building 51. Dust containing beryllium also was found in shelves where the solid beryllium was stored. In addition, beryllium may be present in beamline target areas inside the Bevatron. Beryllium found to date has been cleaned up in accordance with regulatory standards. If additional beryllium is found, contractors meeting DOE requirements (10 CFR 850) for beryllium cleanup operations would be engaged. All work would be performed in accordance with the LBNL *Integrated Worker Health and Safety Program for Beryllium Activities at the Berkeley Laboratory* (August 1, 2000).

¹⁴ Lead in industrial-use paints is still permitted. However, most manufacturers have substantially reduced the amount of lead in such paints.

¹⁵ HEPA filters are high-efficiency filters that remove at least 99.97 percent of all particles that are greater than 0.3 microns in size.

Chromium

The wooden and plastic parts of the cooling tower contain low concentrations of chromium, which was used in water treatment chemicals. Handling and disposal of the cooling tower would be performed in accordance with PUB-3000.

Crystalline Silica Dust

The concrete slab and foundation that would be demolished contain crystalline silica.¹⁶ Silica is a hazardous substance when it is inhaled, and the airborne dust particles that are formed when the concrete is broken, crushed, or sawn pose potential risks. The potential risks are to workers performing demolition activities or other activities adjacent to the demolition.

LBNL would require contractors to meet the Threshold Limit Values (TLVs) for crystalline silica in air set by the American Congress of Governmental Industrial Hygienists. Dust control measures, such as the use of water/fogger sprays, HEPA-filtered equipment, or other engineering controls, would be implemented at the point of dust generation. If these controls cannot keep worker exposures below TLVs, workers would use respirators to limit their exposure to silica dust. Section IV.B, Air Quality, discusses general dust control measures.

The levels of silica dust at neighboring buildings or off-site locations would be at non-hazardous levels in large part due to dust control measures. For any crystalline silica that would be released, dilution and dispersion would ensure that ambient dust levels at these locations would remain well below BAAQMD levels of concern.

Subsurface Contamination

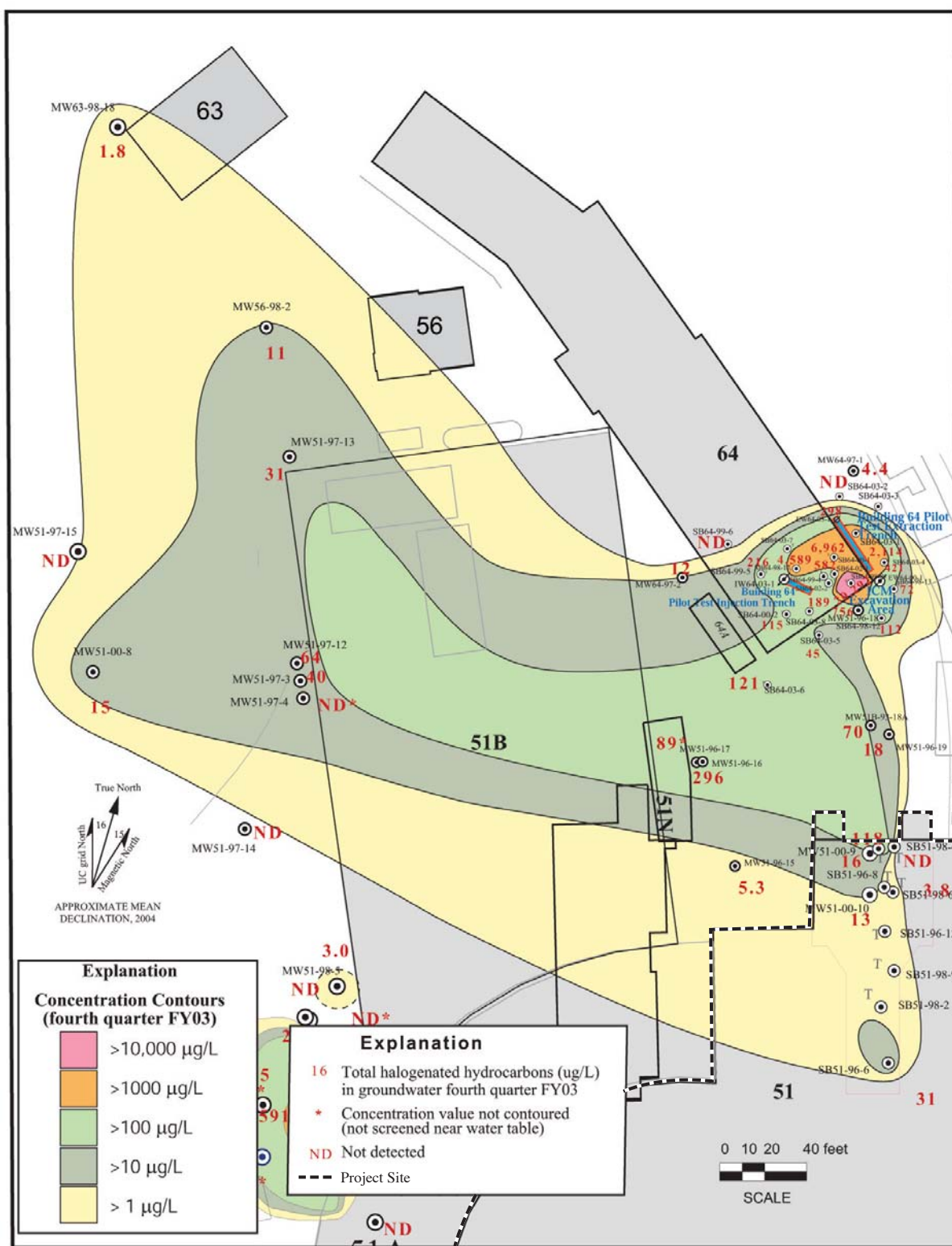
The project site is not listed on the DTSC's Hazardous Waste and Substances Sites List, also known as the Cortese List. However, subsurface investigations have been conducted by Berkeley Lab in the vicinity of Building 51 since the early 1990's, and it is known that a portion of the demolition zone (the Building 51 footprint) is underlain by the edges of two groundwater plumes -- the Building 51/64 and the Building 51L Groundwater Solvent Plumes -- containing volatile organic compounds (VOCs).¹⁷ These are shown in **Figures IV.F-1 and IV.F-2**.¹⁸

The Building 51/64 Groundwater Solvent Plume extends westward from the southeast corner of Building 64. The principal plume constituents are halogenated VOCs that were used as cleaning solvents, including 1,1,1-trichloroethane, trichloroethene (TCE), tetrachloroethene (PCE), and their associated degradation products (e.g., 1,1-dichloroethene (DCE), 1,1-dichloroethane, cis-1,2-DCE, and vinyl chloride).

¹⁶ There are no plans to demolish the concrete shielding blocks; these would be removed intact.

¹⁷ As described in Section IV.G, Hydrology, groundwater at the site varies from 10 to 90 feet below ground surface. Groundwater samples are analyzed at LBNL's own state-certified laboratory, while soil samples are sent to off-site state-certified laboratories.

¹⁸ These figures show partial footprints of Building 51. For orientation purposes, see **Figure III-2** in Chapter III (Project Description). It should also be noted that **Figures IV.F-1 and IV.F-2** include the former outlines of Building 51B and Building 51L, structures that were removed from LBNL in 2004.



SOURCE: LBNL (2005)

Demolition of Building 51 and the Bevatron / 204442 ■

Figure IV.F-1

Total Halogenated Hydrocarbons in Groundwater,
 Building 51/64 Groundwater Solvent Plume

The Building 51L Groundwater Solvent Plume is centered near the southwest corner of the former Building 51L. The principal plume constituents are halogenated VOCs that were used as cleaning solvents, including TCE, PCE, and associated degradation products (e.g., cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride).

In addition, PCBs were detected in groundwater samples collected beneath the Building 51 foundation. Soils underneath portions of the site were contaminated by VOCs, petroleum hydrocarbons, PCBs, and mercury.

Remediation (i.e., cleanup) of the above contamination has proceeded as follows:

General (LBNL-Wide)

Berkeley Lab's HWHF operates under a RCRA Hazardous Waste Facility Permit. Under RCRA, LBNL is required to undertake corrective action for all historical releases of hazardous wastes, including hazardous constituents from any Solid Waste Management Unit (SWMU).¹⁹ (Corrective action refers to the activities related to the investigation, characterization, and cleanup of releases of hazardous waste or hazardous constituents under RCRA.) Therefore, the permit requires that Berkeley Lab investigate and address historic releases of hazardous waste and hazardous constituents that may have occurred both at the HWHF and at SWMUs throughout the Berkeley Lab site. The DTSC is the regulatory agency responsible for enforcing the provisions of Berkeley Lab's Hazardous Waste Facility Permit, including the activities required under the RCRA Corrective Action Plan (RCRA CAP) process. DTSC consults with such other agencies as the San Francisco Bay Regional Water Quality Control Board, DOE, and the City of Berkeley Toxics Management Division.

The RCRA CAP Process has several primary components:

- RCRA Facility Assessment (completed in 1992);
- RCRA Facility Investigation (completed in 2000);
- Interim Corrective Measures (ICMs) (ongoing);
- Corrective Measures Study (draft CMS) (submitted to DTSC in 2004); and
- Corrective Measures Implementation (CMI) (anticipated to begin in 2005).

Berkeley Lab currently is in the CMS phase of the RCRA CAP process. A CMS Report has been prepared by the Laboratory, and DTSC has determined that this report is technically complete. It is available for public review on the Lab's website at <http://www.lbl.gov/ehs/erp/html/documents-draft-cms.shtml>, and at the downtown Berkeley Public Library. The components of the RCRA CAP process are described in detail in the CMS Report, and the reader is referred to that document for information beyond that provided in this EIR.

The purpose of the CMS Report is to recommend appropriate remedies that can eliminate or reduce potential risks to human health from chemicals of concern in soil and groundwater and

¹⁹ "Solid Waste Management Unit" means any unit at a hazardous waste facility from which hazardous constituents might migrate, irrespective of whether the units were intended for the management of wastes.

that can protect groundwater and surface water quality. A CEQA Initial Study/Negative Declaration was prepared for the CMS and is available for review on the DTSC website at http://www.dtsc.ca.gov/HazardousWaste/LBNL/LBNL_CEQA_IS-NegDec.pdf (DTSC, 2005). National Environmental Policy Act (NEPA) documentation is contained in Chapter 7 of the CMS. DTSC solicited public comments on the CMS Report and the Initial Study/Negative Declaration from April 25 through June 8, 2005, and held a public hearing on May 26, 2005. After consideration of public comments, the next step will be for DTSC to approve the CMS Report and final remedy selection and issue a Modified Hazardous Waste Handling Facility Permit.

Corrective Action at Units Relevant to Building 51

The RCRA CAP process identified two SWMUs at Building 51. While corrective action measures have addressed and will continue to address subsurface contamination in the vicinity of Building 51, the RCRA CAP is a preexisting activity that is independent of the proposed Building 51 and Bevatron demolition project. The RCRA CAP would take place whether or not the proposed project proceeds. At the same time, the proposed project would be configured such that it would not interfere with the successful continuation of the RCRA CAP.

As part of interim corrective measures, cleanup activities have already been conducted in many areas of the Lab, including two soil units at Building 51, the Motor Generator Room and Vacuum Pump Room. The main contaminants of concern were PCBs, waste oil, and vacuum pump oil. After soils were excavated, contaminants were reduced to levels considered "protective of human health and the environment" under EPA risk assessment guidelines.

To remediate the Building 51/64 Groundwater Solvent Plume, contaminated source area soils located at the southeast corner of Building 64 were excavated as an ICM in August 2000 and a groundwater extraction system was installed in the backfilled excavation. In addition, an in situ soil flushing pilot test is being conducted in the source area to prevent further migration of contaminants in groundwater. To divert discharges away from the North Fork of Strawberry Creek, an ICM was also implemented that routes water from the Building 51 subdrain system to a groundwater treatment system using granular activated carbon. The treated groundwater is then discharged to the sanitary sewer under an EBMUD wastewater discharge permit.

As a result of these measures, the remaining soil contaminant concentrations in the source area are below cleanup standards, and groundwater contaminants have generally shown gradual long-term declines over most of the plume area. The CMS Report recommends that the following further corrective actions be undertaken in the CMI phase: continued in situ soil flushing combined with groundwater capture in the plume source area, monitored natural attenuation for the downgradient portion of the plume, and continued surface water (subdrain effluent) capture and treatment until groundwater discharge to surface water is shown to be below detectable levels.

To remediate the Building 51L Groundwater Solvent Plume, the groundwater level has been lowered, using pumping from two extraction wells, to stop any discharge of contaminated

groundwater to surface water. The treated groundwater is then discharged to the sanitary sewer under EBMUD permit.

The CMS Report recommends that the following further corrective actions be undertaken in the vicinity of the project site in the CMI phase: excavation and off-site disposal of saturated and unsaturated zone soils in the plume source zone, monitored natural attenuation for the remaining plume area, and rerouting or lining of the storm drain to prevent migration of groundwater contaminants to surface water. For more complete descriptions of contamination and corrective action measures in the vicinity of Building 51, the reader is directed to the CMS Report. Once Building 51 is demolished, further investigation for potential soil and groundwater contamination at portions of the site that were previously inaccessible would take place, and appropriate corrective measures would be undertaken as necessary.

Fire Hazards

LBNL is located near undeveloped land in the Oakland and Berkeley Hills. Portions of this land are wooded with native canyon stands of oak and California bay or with introduced plantations of eucalyptus or conifers. At the project site, extensive natural vegetation both within and surrounding LBNL creates the greatest potential for fire hazard. As discussed in Section IV.C, Biological Resources, however, the Building 51 site itself is almost entirely developed and devoid of vegetation, with the exception of small landscaped areas. It is surrounded by a mosaic of other existing buildings, paved areas, and fragmented areas of open space.

Fire protection services for the project site are provided by Berkeley Lab through a contract with the Alameda County Fire Department, which maintains an on-site fire station. Fire personnel are also trained in emergency medical services and hazardous materials response. In addition, LBNL maintains an automatic aid agreement with the City of Berkeley to provide support during the summer fire season and in the event of a hillside wildfire. Section IV.J, Public Services, addresses fire protection services in detail.

Impacts and Mitigation Measures

Significance Criteria

The potential exposure of the proposed project to hazards and hazardous materials would be considered significant if it would exceed the following standards of significance, in accordance with Appendix G of the state CEQA Guidelines and the UC CEQA Handbook:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;
- Create a significant hazard to the public or the environment through reasonable foreseeable upset and accident conditions involving the release of hazardous materials into the environment;

- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;
- Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment;
- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, result in a safety hazard for people residing or working in the project area;
- For a project located within the vicinity of a private airstrip, result in a safety hazard for people residing or working in the project area;
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan;
- Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands; or
- Exceed an applicable LRDP or Program EIR standard of significance.

The Initial Study (see Appendix A) found that the project would not involve a hazardous materials site as defined by Government Code Section 65962.5 and would not be located within an airport land use plan or near an airport or airstrip. This EIR therefore does not discuss these issues further. As explained in the Initial Study, the project would be located approximately 1,300 feet from the Lawrence Hall of Science (an educational institution) and approximately 0.28 mile (just over one-quarter mile) from the UC Berkeley campus; there are no existing or proposed Kindergarten-twelfth grade schools within one-quarter mile of the project site.

Measures Included as Part of the Project

The following relevant and potentially significant impacts resulting from exposure to hazards and hazardous materials have been anticipated and analyzed pursuant to CEQA as part of the programmatic 1987 LRDP EIR, as amended, from which this analysis is tiered:

Impact IV-K-1:	Continued UC operation of LBNL, including proposed increases in laboratory and facility space, may result in impacts from the increased use of hazardous materials in research, facility construction, and facility maintenance activities.
Impact IV-K-2:	Continued UC operation of LBNL, including proposed increases in laboratory and facility space, is expected to result in the increased generation and discharge of hazardous wastes, including off-site disposal of hazardous, radioactive, and medical wastes, from research, facility construction, and facility maintenance activities.

Impact IV-K-3:	Continued UC operation of LBNL, including proposed increases in laboratory and facility space, will result in the increased transportation of hazardous materials and wastes.
Impact IV-K-4:	Continued UC operation of LBNL, including proposed increases in laboratory and facility space, will result in the upgrading or removal of regulated building components.
Impact IV-K-5:	Continued UC operation of LBNL, including proposed increases in laboratory and facility space, will result in increased numbers of employees and thus increase the potential for exposure to hazardous or radioactive materials.
Impact IV-K-6:	Continued UC operation of LBNL, including proposed increases in laboratory and facility space, will result in a need to continue emergency preparedness and response programs to minimize impacts which may result from actual or potential release of hazardous materials in the workplace or the environment.
Cumulative Impacts:	No significant cumulative impacts are expected.

As a result of potential exposure to hazards and hazardous materials, the following mitigation measures, adopted as part of the 1987 LRDP EIR, as amended, are already required for the proposed project, and are therefore incorporated as part of the proposed project's description:

Mitigation Measure IV-K-1:	LBNL will prepare an annual self-assessment summary report. The report will summarize environment, health, and safety program activities, and identify any areas where LBNL is not in compliance with laws and regulations governing hazardous materials, hazardous waste, hazardous materials transportation, regulated building components, worker safety, emergency response, and remediation activities.
Mitigation Measure IV-K-2a:	Prior to shipping any hazardous materials to any hazardous waste treatment, storage or disposal facility, LBNL will confirm that the facility is licensed to receive the type of waste LBNL is proposing to ship to that facility.
Mitigation Measure IV-K-2b:	LBNL will continue its waste minimization programs and strive to identify new and innovative methods to minimize hazardous waste generated by LBNL activities.
Mitigation Measure IV-K-3:	LBNL will require hazardous waste haulers to provide evidence that they are appropriately licensed to transport the type of wastes being shipped from LBNL.
Mitigation Measure IV-K-5:	In addition to implementation of the numerous employee communication and training requirements included in

regulatory programs, LBNL will undertake the following additional measures as ongoing reminders to workers of health and safety requirements:

Posting, in areas where hazardous materials are handled, of phone numbers of LBNL offices, which can assist in proper handling procedures and emergency response information.

Continuing to post “Emergency Response and Evacuation Plans” in all LBNL buildings.

Continuing to post all sinks in areas where hazardous materials are handled with signs reminding users that hazardous wastes cannot be poured down the drain.

Continuing to post dumpsters and central trash collection areas where hazardous materials are handled with signs reminding users that hazardous wastes cannot be disposed of as trash.

Mitigation Measure IV-K-6: LBNL will update its emergency preparedness and response program on an annual basis, and will provide copies of this program to local emergency response agencies and to members of the public upon request.

Impacts

Impact IV.F-1: Project-related activities that include removal of lead dust or asbestos building materials, cutting or removal of equipment or structural materials, or the processing and removal of concrete shielding blocks or slabs would involve substances that could be a hazard to workers, the public or the environment. (Less than Significant)

Various types of hazardous materials would be encountered during demolition activities. About half of the truck trips that would transport materials for disposal off-site would carry non-hazardous construction debris and solid waste, and about half would carry some type of hazardous waste, low-level radioactive waste, or mixed waste. As described in Section IV.L, Utilities, Services Systems, and Energy, of the truckloads carrying radioactive waste, the great majority would be of low activity, volume-contaminated items.

The project would incorporate activities and programs to ensure compliance with regulatory and LBNL-specific requirements. Because some equipment and building surfaces in Building 51 are contaminated with hazardous materials at levels that could pose potential hazards to demolition workers, the project would include thorough surveys for all suspected materials, and, if necessary, cleanup of surface contamination on the equipment to be removed and building surfaces to be demolished. This process of removing surface contamination by hazardous materials would follow standard LBNL policies and procedures, which are designed to remove or seal and dispose of these contaminants without hazard to workers, the public, or the environment in accordance

with regulatory requirements. Once the surface contaminants have been removed to acceptable levels, general demolition activities would proceed.

Asbestos abatement would be conducted under the LBNL Asbestos Management Program. Before demolition activities proceed, a screening survey would identify ACMs and a sampling program would be used to assess and quantify ACMs for removal. A licensed and certified asbestos abatement contractor would remove ACMs following regulatory requirements. Asbestos-Certified LBNL personnel would oversee the ACM abatement.

Levels of crystalline silica dust would be controlled at the emission source to limit worker exposure. These controls would also help maintain compliance with air quality emissions standards described in Section IV.B, Air Quality, keeping dust concentrations at off-site receptors below levels of significance.

Materials that LBNL has reason to suspect might contain radioactivity would be characterized according to DOE-approved protocols and disposed appropriately, as described above. Due to the low levels of radioactivity present in the concrete that would be subjected to jackhammering or otherwise broken up, as well as the protective measures (e.g., applying water for dust suppression) described in Section IV.B, Air Quality, it is expected that no detectable radioactivity would be contained in the dust generated by the project.

The project would include off-site disposal of items containing low levels of radiological activity. The low levels of such activity, coupled with the employment of appropriate safety measures in accordance with LBNL operational procedures (e.g., as set in LBNL PUB-3000), would ensure that any exposure resulting from the shipment of these items to LBNL employees and contractors (e.g., truck drivers), and to the general public (e.g., pedestrians, or passengers in a car idling in traffic next to a truck containing such items), would be far below applicable regulatory limits during normal operations.²⁰ The shipments with the highest levels of radioactivity would be two or three shipments of depleted uranium. The estimated dose to a hypothetical passenger sitting for one hour in a car positioned two meters (about six-and-a-half feet) from a truck carrying depleted uranium would be 0.2 mrem. For a hypothetical pedestrian standing for 15 minutes at a distance

²⁰ For transport workers, the applicable DOT regulatory limit is 2 mrem per hour. (49 CFR 173.441(b)(4)). For LBNL employees, the annual occupational exposure to general employees at DOE facilities such as the Laboratory is not to exceed a total effective dose equivalent of 5 rem (1 rem = 1,000 mrem) (10 CFR 835.202(a)(1)). Lesser annual exposure limits are set for employees who are pregnant women (500 mrem to the embryo/fetus from the period of conception to birth), and for minors who are occupationally exposed to radiation and/or radioactive materials (100 mrem) (10 CFR 835.206, 207). The LBNL Radiation Protection Program, which implements 10 CFR 835 at the Laboratory, also sets two administrative levels that can be exceeded only with the approval of relevant authorities:

- A Department of Energy Administrative Control Level for workers of 2 rem whole body exposure per year per person is established for all DOE activities. Approval by the DOE Program Secretarial Official or designee is required prior to allowing a person to exceed this level.
- LBNL itself has set an Administrative Control Level of 1 rem per year for whole body exposure. Approval by the Deputy Laboratory Director is required prior to allowing a person to exceed this level.

The exposure of members of the public to radiation sources as a consequence of all routine DOE activities shall not cause, in a year, an effective dose equivalent greater than 100 mrem (DOE Order 5400.5). This standard includes exposure to both airborne radionuclides and penetrating radiation. As mentioned earlier in the text, EPA established a limit of 10 mrem/year for airborne emissions for the general public (40 CFR 61).

of two meters from such a shipment, the estimated dose would be 0.05 mrem. These are conservative assumptions, as it is unlikely that any individual member of the public would be within this distance of these shipments for these lengths of time. Even under these circumstances, the resulting exposures would be hundreds of times below the DOE regulatory limit applicable to members of the public, and below the standards of significance set out earlier. Exposures would be less at greater distances and lesser durations.²¹ For LBNL workers and contractors, the largest reasonably foreseeable exposure would be to truck drivers transporting depleted uranium blocks. A driver would receive a maximum dose of about 0.03 mrem per hour. This estimate, which does not factor in the likely lessening of the dose due to attenuation as radiation passes through the truck cab, also is far below the applicable regulatory limit and below the applicable standards of significance. See Section IV.K, Transportation/Traffic, for a discussion of the potential for accidents during the transportation of materials that would be generated by the proposed project.

As a result of the above factors, the potential impacts of hazardous materials, hazardous waste, and other hazards discussed in this section would be reduced to less than significant.

Mitigation: None additional required.

Impact IV.F-2: Demolition activities associated with the proposed project would include earthmoving activities such as grading and filling that could expose construction workers and/or the environment to hazardous materials. (Less than Significant)

Grading, filling, and minor excavation to remove contaminated soil would occur during demolition of the building and foundations. Since the concrete slab that surrounds Building 51 would remain in place, this grading, filling, and minor excavation would occur within the Building 51 footprint. Although substantial efforts have been made to locate and sample potentially contaminated environmental media under the building, additional areas of contamination could potentially be discovered during demolition activities, which could potentially result in exposures to demolition workers and/or the environment. Thus, in response to the discovery of conditions that indicate potential contamination, testing would be conducted in these areas prior to allowing work to proceed. Should contamination be present, LBNL would implement necessary measures to protect people and the environment from exposure, in accordance with the regulatory frameworks, and policies and procedures, described earlier in this section. These measures would be contained in a site-specific work plan and a site-specific safety plan, and would be consistent with those required under federal and state hazardous materials regulations and guidelines.

Dewatering may be necessary during project activities because groundwater can be as shallow as 15 feet below ground surface in the vicinity of the site. It is not yet known whether the excavation

²¹ For example, the exposure to an individual standing for an hour at three meters (about 10 feet) distance from a depleted uranium shipment would be 0.12 mrem. At six meters the dose would be one-fourth of that dose at three meters, and at 12 meters it would be one-fourth of the exposure at six meters.

would intersect the existing groundwater plumes, which are located adjacent to the project site. As a prudent practice, however, the project would consider all soil and groundwater collected during these activities as potentially contaminated. In accordance with existing LBNL policies, any groundwater extracted during demolition activities would be appropriately contained and tested prior to determining the appropriate disposal option.

Prior to the start of excavation, the project management team would obtain information on known residual soil and groundwater contamination in the project area. The project management team would be responsible for ensuring that bid specifications disclose known locations and concentrations of hazardous chemicals in soil and groundwater that could be encountered by contractors. Any intrusive work in areas where contaminants are present would be performed by properly trained contractors with oversight by the project management team and assistance from the EH&S Division (e.g., for soil, water, or air monitoring or auditing). If residual soil or groundwater contamination is encountered during demolition, it would be managed in accordance with applicable DOE and Berkeley Lab policies and state and federal regulations regarding hazardous material handling and hazardous waste management.

Project activities would likely involve the use of hazardous materials such as solvents and petroleum products. The use of hazardous materials best management practices (BMPs) during demolition would be required as part of the proposed project under a project-specific Storm Water Pollution Prevention Plan (SWPPP), as discussed in Section IV.G, Hydrology and Water Quality. Common BMPs include following manufacturers' instructions and securely storing hazardous materials at an appropriate distance from surface water bodies. In addition, as in all phases of the project, excavation and grading activities would comply with applicable state and federal regulations, as well as LBNL-specific policies, that govern hazardous materials exposure of workers, the public, and the environment. Potential exposure of workers, the public, and the environment to hazardous materials would be minimized through development of the site-specific work and safety plans in accordance with LBNL standard operating procedures, and proper handling, storage, and disposal of contaminated soil and groundwater. This would reduce impacts, including the potential for spills of hazardous materials, to less-than-significant levels.

Mitigation: None additional required.

Impact IV.F-3: The project would reduce exposure of people and structures to wildland fire hazards. (Beneficial)

As it would remove a structure and persons associated with it, the project would decrease current exposure to wildland fire hazards. Areas currently occupied by the Building 51 structures would be replanted in accordance with LBNL's Integrated Landscape Management Program, using drought-tolerant native grasses. Landscaping details would include ground cover for erosion control. As described in Section IV.H, Land Use and Planning, the proposed project would implement existing design guidelines, as described in the 1987 LRDP, and would be generally

consistent with this document. The proposed project would not interfere with implementation of LBNL's emergency response or evacuation plans, because access roads would not be blocked.

Mitigation: None required.

Cumulative Impacts

Impact IV.F-4: The proposed project, when combined with other proposed LBNL and nearby development, would result in a decreased exposure to hazards and hazardous materials. (Beneficial)

Corrective measures have been and will be put into place to clean up subsurface contamination at the project site and at LBNL generally. The proposed project, together with the implementation of RCRA corrective measures, would have a cumulative beneficial impact on soil and groundwater contamination at the Lab by removing hazardous materials and waste. The project would result in an overall decrease of hazardous materials at the project site through demolition, removal and off site disposal in accordance with all applicable regulations. There were no significant potential impacts identified for the handling, transportation, or disposal of the hazardous materials.

Therefore, the project would not combine with the other projects identified in this EIR at LBNL, in the City of Berkeley, or on the UC Berkeley campus to create a significant cumulative increase in exposure to hazards or hazardous materials.

Please refer to the cumulative impacts discussion in Section IV.A, Aesthetics, for a discussion of the reasons why the cumulative effects of a potential future project of unknown purpose and size at the Building 51 site are expected to be less than significant.

Mitigation: None required.

Summary of Impacts and Mitigation Measures

The proposed project would not exceed applicable standards of significance and would result in no significant impacts related to hazards and hazardous materials. The project would incorporate Mitigation Measures IV-K-1, IV-K-2a, IV-K-2b, IV-K-3, IV-K-5, and IV-K-6 from the 1987 LRDP EIR, as amended.

Building 51 Demolition Project-Specific Mitigation Measures: None required.

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